

# The Bellows

## PUGET SOUND PHOTOGRAPHIC COLLECTOR SOCIETY

**WHAT:** REGULAR MEETING OF PSPCS

**WHERE:** DES MOINES MASONIC TEMPLE, 2208 S. 223RD ST (TAKE MIDWAY EXIT OFF I-5, GO TO FIRST STOP LIGHT WEST OF PACIFIC AVE SOUTH, TURN RIGHT UNTIL 223RD, THEN TURN WEST (LEFT). THE TEMPLE IS JUST WEST OF THE FIRE STATION)

**WHEN:** THIRD THURSDAY OF THE MONTH (EXCEPT JULY & AUGUST). NEXT MEETING IS 09/17/15, 7 - 9 PM (DOORS OPEN AT 6 PM)

**WHY:** TO SHARE AND ENJOY THE COMPANY OF OTHER WHO ARE INTERESTED IN COLLECTING EVERYTHING PHOTOGRAPHIC

**MEETING AGENDA:** A SHORT BUSINESS MEETING, SHOW & TELL, **EXTENDED CAMERA REPORTS**, AUCTION (ONE ITEM PER MEMBER) AND DOOR PRIZE

## NASA Releases Thousands of Apollo Images

Special points of interest:

- *Apollo Images Released by NASA*



Even the dealers at our show will show their colors. Go



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NASA recently released over 11,000 images from the Apollo space missions via the [Project Apollo Archive on Flickr](#), and I have spent the past few days looking through them. Spoiler alert: They're awesome.

The thousands of images are unprocessed scans of the original film magazines shot by U.S. astronauts, and they chronicle Apollo missions 7-17. [The Project Apollo Archive](#) has even been kind enough to sort the Flickr albums based on [the film magazines the images were originally shot on](#), which is just plain cool. Taking a few minutes out of your day to browse through the blend of Hasselblad and



35mm film scans is well worth your time.



Here are some other links to the space related places and programs: [Space Center Houston](#), touring [Johnson Space Center](#), and [Pulitzer Prize winner Smiley Pool](#) in photographing group portraits of the [crews of the first and last space](#)

[shuttle missions](#),

### Additional Tidbits on the Web

Mike Immel's [Light Meter Collection](#) on FB

Western Photographic Historical Society ([WPHS](#))

The Photographic History Society of New England ([PHSNE](#))

2015 Argus Collectors Group Ann Arbor [Fall Conference](#) October 22-25. Bob Kelly will be there, how about you.

PSPCS on [Facebook](#). Come see what you are missing!

### Program: Two Camera Reports

Bill Adams and Darrel Womack will give camera reports at our October meeting.





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## PSPCS Meeting Minutes

**Date:** Sept. 17, 2015

The Meeting was called to order by Mike Immel at 6:57pm. There were 26 members or guests in attendance.

**Officers present were:** Mike Immel – President, Walt Hughson – Vice President, Don Friend – Secretary.

**Officers absent were:** Shirley Sparrow – Treasurer

**Announcements:** San Jose Show is Nov. 7<sup>th</sup>. They are working on a Portland show possibly in 2016. The Lee Scheeler and Joe Storey camera collection sales were a big success.

**Old Business:** Please pay your dues

**New Business:** We have changed our bank account to Well Fargo.

**Camera Report:** Bill Adams and Darrel Womack will give camera reports at the October meeting.

**Show and Tell:** 12 members brought or told stories about 24 different items.

**Program:** Terry Luck gave a very informative and interesting talk on Zeiss Ikonta and Super Ikonta cameras. The club presented him with an early Super Ikonta B that he did not have in his collection.

**Auction:** 1 items was available for auction and sold for \$5.00.

**Door Prize:** The door prize tonight was won by Darrel Womack

**Adjournment:** Meeting was adjourned at 8:55pm.

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## Contact Information

The Bellows Newsletter is published 10 times per year by the Puget Sound Photographic Collectors Society, Inc. Editor: Michael Immel email—[shutterf64@yahoo.com](mailto:shutterf64@yahoo.com)

Information for the Bellows should be sent to: [shutterf64@yahoo.com](mailto:shutterf64@yahoo.com)

The PSPCS internet address is <http://www.pspcs.org>

Facebook Page: <https://www.facebook.com/pages/Puget-Sound-Photographic-Collectors-Society/125678560778201>

Wiki - <http://fastglass.wikispaces.com/>

Dues are \$20.00 per year (Jan-Dec) and should be sent to Treasurer Shirley Sparrow, 300 Pease Road Cle Elum, WA. 98922. (509) 674-1916, Email: [sesparrow9@msn.com](mailto:sesparrow9@msn.com)

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Meters from Mike  
Immel's collection

## Who Invented the Modern Exposure Meter?

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Who invented the automobile? It depends on how you define "automobile." Most definitions give the credit to Karl Benz, but people had been experimenting with automobiles for almost a century prior, and you have to go to the 1912 Cadillac to find something close to what we have today. Marconi is popularly considered the inventor of radio, though Nikola Tesla and others often get credit; but it was Howard Armstrong who took Lee DeForest's Audion vacuum tube and made it into an amplifier, which transformed radio into something useful and practical. The Wright Brothers invented a 3-axis control system and applied it to Otto Lilienthal's glider to make the airplane. Most practical inventions aren't created so much as developed over time.

The invention of the photo-electric meter is one of the haziest examples of "invention." Since the early days, photographers have looked for fool-proof ways to measure the quantity of light on a subject so that they could determine proper exposure. For most of the 19th century however, when most photographers made their own emulsions from scratch and sensitivity was so low that exposures were measured in minutes, past experience trial and error was the most effective method. But as materials began to be mass-manufactured, standardization and batch-differences narrowed and the results became more repeatable. And as photo-chemistry and optics advanced, exposure times dropped into fractions of a second and exposure accuracy became increasingly important.



Actinometer, c1900

The earliest photographers compiled and consulted tables, which at least got them in the ballpark. Well, maybe. The problem with tables, then and now, is that there's a whole world of possibilities for interpretation. How bright is cloudy bright? What if it's partial overcast at a high latitude on a mid-summer's day, which can very different than partial overcast at a low latitude on a mid-summer's day?

Instruments and other aids began to appear as a way to evaluate light. The actinometer used printing-out-paper (called pop), which turns dark on exposure to light without needing chemicals, enjoyed a heyday

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around the 20th century. A typical actinometer looked like a pocket watch and it had a pie-shaped sliver cut in the face. Discs of pop were placed inside the case. To take a reading, the user would rotate the pop to uncover an unexposed wedge, then time how long it took the wedge to darken to the point where it matched a reference shade of grey. The photographer then looked up the time on a chart and that gave him time-aperture combinations. Not a bad system, but pop didn't always react to light the way film did, they had to be loaded in the dark, and comparing shades of gray requires a lot of subjective judgement.



Extinction Meter

Extinction meters became popular in the early 20th century. To use them, the photographer would peer through the meter at the scene and see a series of gradually darkened numbers or letters. The letter that was faintest but still viewable was then looked up on a table, and time/aperture combinations could be found. The idea was that the brighter the scene, the more items on the scale would be visible. Unfortunately the human eye has a live iris that adjusts automatically, so the meters were not as good as the originally idea sounded. Still, they were very inexpensive to produce and if used very quickly and often enough to get the hang of it, they were better than nothing.

A better version, but larger and heavier and thus mostly used in laboratories, included some sort of light standard (like a little light bulb) that could be directly compared against an unknown. The user would dial a graduated filter or adjust an aperture until the unknown light source and the "standard" were judged equal. The settings used to make the adjustments could be looked up in a table or on a calculator dial to determine the amount of light seen. This method was still being used well into the 1970s as the highly regarded [S.E.I Photometer](#).

But all of these methods were *subjective*. They required the photographer to make judgements and interpretations. What many people wanted was an objective method to measure light—something that would be repeatable and not affected by optical tricks or judgement or human eyesight.

With the development of electrical engineering in the late 19th century, the best candidate appeared to be the selenium cell, as invented by Charles Fritts in 1884. The Fritts cell was a layer of selenium metal mounted on a copper plate. A transparent layer of gold was layered over the top of the selenium. The electrodes tapped the copper and the edge of the gold. When light struck the selenium surface, electricity flowed through the circuit. Since electricity was being produced, this was called *photovoltaic*, something that produced current.

The problem was the Fritts cell was that it put out a tiny little bit of electricity; so much so that it required a very sensitive ammeter to measure the current. That was possible in a laboratory, but impractical for anything else. But that was in the late 1800s. By the end of the First World War, the state of the art had progressed to where ammeters were smaller, more sensitive, and more practical for this kind of application. But they weren't quite there.

Enter the *photoresistor*, around 1913. This is a variation of Fritts selenium cell, called the Gripenberg cell. This time the slim gold plate is cut into an extremely long conductive surface. Each electrode is tied to one end of the gold trace, so that an electrical current flows



across the top of the cell.

So what happens is that an outside electrical current sent along the gold trace. The selenium influences the conductivity of the gold. When no light strikes the cell, the gold is extremely resistant and very little current passes. As light strikes the cell, however, the resistance drops. An ohmmeter measures the resistance across the cell; the lower the resistance, the more light is striking the cell.



This changed things, because now instead of measuring a trickle of a current with a highly sensitive meter, you could instead apply a larger current and measure the resistance. That was very do-able.

To the best of my knowledge, and I'm going solely by what I see here, this is the basis of the Electrophot meter. Manufactured and sold by J. Thomas Rhamstine out of Detroit, Michigan, many argue that this is the first photo-electric meter that was commercially sold (an ad appeared for it in a 1931 issue of **Home Movies** magazine). The Electrophot used batteries, which in the late 20s were not the dainty little things they are today. And if you look at the business end of the meter, you can see the cell very clearly. Does that look like a Gripenberg cell to you? Does to me, too.

The electrophot was heavy, weighing in at around 1-½ lbs, it's luggable. While it could be used in the field, it's much more likely it would be used in a studio where it's size and weight weren't such a problem, and that if the battery died, it could be more easily replaced.

There was also this stuff called Alnico. Invented by Tokushichi Mishima in Japan in the late 20s, Alnico was a mixture of Aluminum, Nickel, Cobalt (hence AlNiCo) and other elements, which made a far better permanent magnet than anything previously known. Photo-electric light meters use ammeters which measure the amount of electric current flowing through them, and ammeters require permanent magnets as part of their construction.

What Alnico magnets did was make the ammeters a lot more sensitive because they required a lot less current to run. Now a meter could directly measure the tiny amounts of current that a Selenium cell could generate. No batteries necessary.

So much for the internal works. Let's look at the meter face and the whole front side. You read the illumination level on the meter face but that's it. You had to flip it on its back to look up the result on a table to get useful results.

Some people will argue that the Gossen Ombrux (as it was called in Germany. In England it was the Blendux) might be the first photo-electric meter, because unlike the Rhamstine, it used a Fritts photovoltaic cell, probably had an Alnico magnet and didn't need a battery. Because it lacks that battery and a lot of the support, it's much smaller and lighter. The case is bakelite, like metal, and it's about the size of a fat pack of cigarettes. Philip Gossen's microammeter was good enough to pick up that tiny current and still strong enough to take a reasonable amount of knock-about use in the field.

Gossen's meter came out in 1933, about the same time as the Weston Model 617, and it's very likely they were developed concurrently. Chronologically they're both beaten by the Electrophot, but the Gossen is much more practical for the photographer, and very close to what eventually became the state of the art for the next 30 years: a photovoltaic selenium cell in a battery-less circuit.

The Ombrux also has a specialized face, a direct-read aperture scale for 1/32nd shutter speeds. For anything else, tables were available to read the proper exposure based on film stocks and other shutter speeds.

But to my mind, the first real photo-electric meter was this, the Weston Model 617, which was introduced in 1932. Even though it is a year younger than the Electrophot, it is credited with creating the market for photo-electric meters. Why?

*Editor's Note: I wanted to thank James for granting permission to reproduce his article on "Who Invented the Modern Exposure Meter?". You can find a great source of many light meters and many more well written articles of Mr. Ollinger at his website [Ollinger's Light Meter Collection](#).*